Faculty Review of Open eTextbooks

The California Open Educational Resources Council has designed and implemented a faculty review process of the free and open etextbooks showcased within the California Open Online Library for Education (www.cool4ed.org). Faculty from the California Community Colleges, the California State University, and the University of California were invited to review the selected free and open etextboks using a rubric. Faculty received a stipend for their efforts and funding was provided by the State of California, the William and Flora Hewlett Foundation, and the Bill and Melinda Gates Foundation.

Textbook Name:

Biology

License:

Find it: eTextbook Website

Textbook Authors:

OpenStax College (numerous contributors)

Reviewed by:

Virginia Moran

Institution:

Yuba College

Title/Position:

Professor

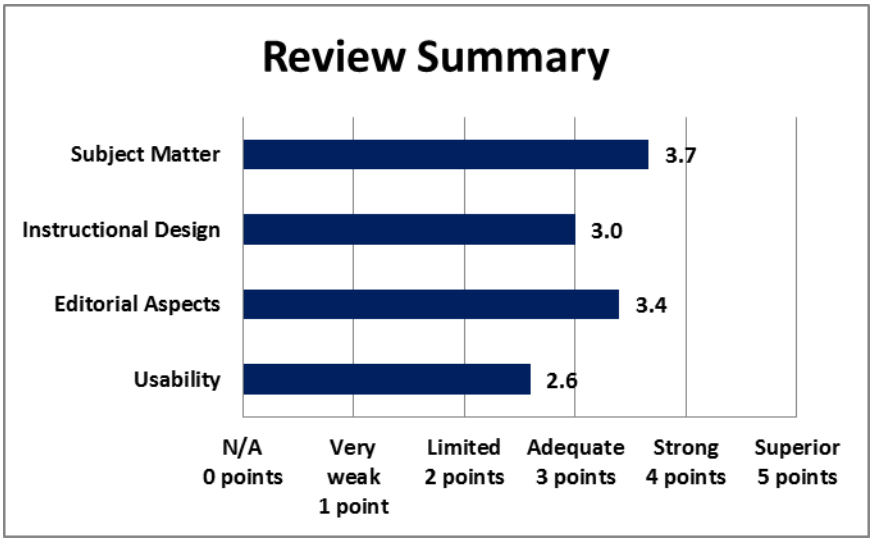
Format Reviewed:

Online

A small fee may be associated with various formats.

Date Reviewed:

August 2015



California OER Council eTextbook Evaluation Rubric

CA Course ID: BIOL 130S

Subject Matter (30 possible points)	N/A (0 pts)	Very Weak (1pt)	Limited (2 pts)	Adequate (3pts)	Strong (4 pts)	Superior (5 pts)
Is the content accurate, error-free, and unbiased?					X	
Does the text adequately cover the designated course with a sufficient degree of depth and scope?				X		
Does the textbook use sufficient and relevant examples				X		

to present its subject matter?						
Does the textbook use a clear, consistent terminology to present its subject matter?					X	
Does the textbook reflect current knowledge of the subject matter?					X	
Does the textbook present its subject matter in a culturally sensitive manner? (e.g. Is the textbook free of offensive and insensitive examples? Does it include examples that are inclusive of a variety of races, ethnicities, and backgrounds?)					X	

Total Points: 22 out of 30

Please provide comments on any aspect of the subject matter of this textbook:

- Subject matter comments are covered under editorial comments.

Instructional Design (35 possible points)	N/A (0 pts)	Very Weak (1pt)	Limited (2 pts)	Adequate (3pts)	Strong (4 pts)	Superior (5 pts)
Does the textbook present its subject materials at appropriate reading levels for undergrad use?				X		
Does the textbook reflect a consideration of different learning styles? (e.g. visual, textual?)				X		
Does the textbook present explicit learning outcomes aligned with the course and curriculum?				X		
Is a coherent organization of the textbook evident to the reader/student?			X			
Does the textbook reflect best practices in the instruction of the designated course?					X	
Does the textbook contain sufficient effective ancillary materials? (e.g. test banks, individual and/or group activities or exercises, pedagogical apparatus, etc.)				X		
Is the textbook searchable?				X		

Total Points: 21 out of 35

Please provide comments on any aspect of the instructional design of this textbook:

- Most of my comments are about the organization of the text, table of contents, etc., so much so that to list all the inconsistencies I found would go on at length so I am just going to sum it up by stating that the organization of text is redundant and confusing. The arrangement of table of contents is not consistent, cohesive, logical. It skips around. It is unclear what the authors intended though they mention one can use the textbook in a sort of 'mix and match' fashion. This is time-consuming and tedious for an already busy teacher. The arrangement and organization of the book/chapters should be re-edited, appropriate sections/chapters that cover the same topics consolidated into individual sections, and the book re-organized such that a student can read it in sequence and each section/chapter builds on the next section. To put this burden on the teacher and student and call it an opportunity to 'mix and match' if you will, is not acceptable. On this note, owing to the disorganized redundancy of this text, the index is woefully inadequate.
- Until this is done, if this is done, a table should be inserted at the beginning of the book that cross references all the chapters that cover the same topic, for example, all the chapters that cover/mention photosynthesis should be listed in this table. All the chapters that cover protein synthesis should be listed. All the chapters that cover evolution should be listed, the human brain, etc. Then a teacher/student can quickly scan this list, making her/his task of assigning the readings much easier. This information can then be used to improve the comprehensiveness of the index.
- Also-text does not refer reader to Appendices, which can also be improved.

Editorial Aspects (25 possible points)	N/A (0 pts)	Very Weak (1pt)	Limited (2 pts)	Adequate (3pts)	Strong (4 pts)	Superior (5 pts)
Is the language of the textbook free of grammatical, spelling, usage, and typographical errors?					X	
Is the textbook written in a clear, engaging style?					X	
Does the textbook adhere to effective principles of design? (e.g. are pages latid0out and organized to be clear and visually engaging and effective? Are colors, font, and typography consistent and unified?)				X		

Does the textbook include conventional editorial features? (e.g. a table of contents, glossary, citations and further references)				X		
How effective are multimedia elements of the textbook? (e.g. graphics, animations, audio)				X		

Total Points: 17 out of 25

Please provide comments on any editorial aspect of this textbook.

- It is assumed that the producers of these textbooks understand that an on-line textbook is never and never will be "done". This is the beauty of an on-line text is the ability to update it continuously with new science, findings, examples, etc. Online textbooks are like gardens--ever in need of tending to insure learning "blooms" continuously. So as it is, I consider this and all of these new online textbooks, "works in progress". The textbook is definitely a work in progress.

- This textbook uses/cites Wikipedia and Wikimedia, etc. We often tell our students that looking things up on Wikipedia will not do it for a research paper yet this textbook cites these sites. I have found accurate and excellent information on both sites but also, questionable information. This is going to have to be reconciled for this program in general. Use Wiki-sites as credible sites/information--or not.

- On my Kobo e-reader, the book is 1,525 pages long! Every single page was looked over, though may not have been read in detail, assuming this level of review has been completed. In the summary of comments below, should authors, editors have any questions/clarifications, please feel free to contact me.

- Needs for edits were noted:
  - Figures/Tables: review every single figure for accuracy, readability, and understandability. Some are quite frankly, not even readable especially the highly detailed figures. They are so small, as to be almost useless. Expand figures to their maximize size for the page. Make them as big as possible. Some examples of problem figures/suggested changes are listed below:
  - "Art Connection": did not like this or understand it. How are the "art connection" illustrations any different from the other figures that use "art" or illustrations? Omit. Change to something like "Test Your Comprehension" or "A Different View", etc. understanding the student has to study the illustration but calling these "art connections" is a bit of a stretch and a tad goofy. Unless you actually tie into "art" per se, omit.
  - Figure 1.13: add text to caption that polar bears may be facing extinction due to climate change.
  - Figure 1.14: put the wing span of a CA Condor in the caption so students have some sense how big these birds are.
  - Figures 3.2 and 3.3 are confusing. My students get d.syn and hyd. mixed up. Not sure why but in thinking like
  - They do, these two figures are confusing.
  - Figure 3.31: needs improvement. Make differences between DNA and RNA more explicit, easier to understand.
  - Table 3.2 Include the role DNA plays in protein synthesis.
  - Section 3.5 Needs editing/improve. Confusing. Will be hard for a biology student to understand.
  - Figure 4.17: chloroplasts also maximize surface area by infolding=the thylakoids. Discussion/concept of maximizing surface area by infolding is inadequate. Provide more examples/figures of this concept.
  - Check Table 3.1 for completeness.
  - Figure 8.19- poor photo. Replace with something like giant saguaro cactus. Barrel cactus. Clearer image.
  - Figure 12.7--there are much better examples of this. Use an image that illustrates this concept better.
  - Figure 14.3=poor
  - 14.14--what?
  - (Side note: page 979 shows a lion. Was it Cecil?)
  - Fig. 26.4: too dark
  - Figure 27.14: include a better geologic time table that shows the periods. Text refers to Cambrian period but does not show it in figure. Does not refer student to A-3 and effectiveness of this geologic time table (A-3) is marginal. Include at least a half to full page, clear, geologic time table in the text or explicitly refer to one in the Appendix.

- Figure 29.32 and 39.14: same figure is used for both chapters--is there supposed to be a difference between these two birds in this diagram? If so, difference is not obvious. Replace and/or improve.
- Figure 46.10--Question is confusing.
- Figure 44.8--photo is poor, dark. Many other species to choose from as well to illustrate this point.
- Link To Learning supplements: again this gets back to the idea of an online text needing constant care and maintenance including these links. Some linked to nothing. Some linked to empty pages. Some programs/videos did not run but showed blank screens. (Ex: page 501, Chap 18--not found; Page 999-empty screen)

- Text
  - For discussion on basic chemistry, list the different particle types now currently known: proton, electron, neutron, quark, neutrino, etc. to illustrate the dynamic nature of this science and particle physics. Did not see a summary table/list of particle types, their charges, etc.
  - Chapter 2: Did not see mention of water as the universal solvent, a concept I have found students "get".
  - Include a figure, insert, etc. regarding the banning of triglycerides (trans fats) in cities across the U.S. (ex: NYC)
  - Chapter 4: discussion of surface to volume ratio, maximizing surface area by infolding, etc. to increase metabolic reactions, etc. is inadequate. Much opportunity here to make the point by discussing how buildings are engineered in cities (skyscrapers) to maximize space, how propagules of plants can pack in hundreds of seeds, etc. Deserves far greater discussion/examples.
  - Discussion of chromatin versus chromosomes is confusing. Also, explain the difference between the sex cells, gametes, etc. and somatic/body cells. Discuss chromosome number as related to each. The concept of pairing, homologs or refer to other places in the text where this is covered.
  - 4.3-endosymbiotic explanation is overly simplistic yet you find it over and over throughout the text in more detail. Again it is imperative that all the other places in the text where "endosymbiosis" is discussed are listed in all the locations until better consolidation of this textbook is completed.
  - Chap. 5-page 145: How Viruses Infect Spec Organs. First sentence. What? Fix/clarify/edit.
  - Chap. 6. page 180 includes a "Sci Method Connection" that requires a student to stare at a melting block of ice and boil some water. Omit or just include thought questions in the chapter : why does water melt? What is happening when water boils? To make this an "exercise" seems well, a bit silly.
  - What phylogenetic/systematic classification system does the book use? (Tree of Life?) It should state this.
  - Chapter 8-This is the second Biology text I have reviewed for OER and once again, alternative pathways of photosynthesis/anatomical adaptations to (C3, C4, CAM) have been completely left out. This is absolutely not acceptable esp. in light of climate change.
  - Chap. 9-fix sentence/punctuation, paragraph 2, page 249 (paracrine signaling)=Take your hand..."
  - Biofilms: bold the term and put in glossary for Chapter 9 (page 266)
  - Chapter 10: redo, re-edit, clean up.
  - Chapter 10- Refers to mitosis and meiosis yet from what I can tell, at this point in the book, the student has not had these lessons yet. Refers to S phase of Interphase without discussing the cell cycle prior. Where is mitosis? There is no listing of it in the Table of Contents. It appears to be buried in the chapters. Should it not be it's own category/heading as is meiosis?
  - "You were once one cell"--make sure this is somewhere in this section, ideally introduction.
  - Page 277: confusing. Students get these concepts confused: homologous chromosomes and sex chromosomes and somatic cell chromosomes. Clarify.
  - Page 285: there is no mention of "protometaphase" versus mention of Interphase. Be consistent. Sometimes it's in a figure/text and sometimes it is not.
  - Beware of confusing cell STRUCTURES with cell CYCLES. Which one are you talking about?
  - Chapter 11: "Mystery of Evol of Meiosis" should include mention of the phenomenon of mitotic crossing over. It does not mention this.
  - Page 314: either list all the organisms with dominant/independent haploid states or do not but missing for plants at least, mosses and ferns.
  - Alternation of generations definition is inadequate/questionable for accuracy. It means that the organism can survive as an independent living organism in either or both states, ex: mosses dom. life history is in the haploid state while its diploid state is dependent on the haploid state. Check def. and

give better examples. Expand explanation. Improve definition in glossary.

- Chapter 15 (15.5): This Chapter has to do to a better job of setting the student up to study protein synthesis. Include an excellent introductory section for Chapter 15 on protein synthesis before diving into the details. Even if repeated, put transcription, translation in the glossary for 15.5.
- Chapter 21: including information on the new Ebola vaccine is absolutely essential (or since viruses are discussed all over the place in the text, somewhere appropriate).
- Chapter 22: combine 22.5/22.3? (Too many other examples throughout the text to list).
- Page 604-22.5: inadequate. Shore-up/improve. There are many more plants than this that host N-fixing bacteria.
- Leghemoglobin is not mentioned anywhere in this chapter on N-fixation or in the text. Because this captures the interest/fascination of the students (because it is) and is metabolically necessary for N-fixation by legumes, include explanation/molecular structure of (=very similar to human heme molecule/blood, hence the term).
- Chapter 23, page 633-23.4/Fig 23.34, calls Phytophthora a protist but it is also considered a fungus by some classifications. Granted, the protists have always been a kind of taxonomic garbage can, but some mention of this should be made. Also, the text should discuss and include a photo of Sudden Oak Death syndrome which is caused by this organism. Mention of this serious problem in California/the west should be included in the text.
- Chapter 24: include definition of ENDOmycorrhizae in glossary.
- Chapter 26: Table 26.3 can be expanded significantly and can include species of periwinkle that cures childhood leukemia discovered in Madagascar. (Interestingly, I found this example cited later in the text (Chapter 47, Figure 47.8)).
- Chapter 27.4: significantly down plays the significance of the evolution of land plants with the corresponding explosion in animal evolution. Why? It is accepted science that this extremely significant evolutionary step led to a subsequent increase/diversity in animal evolution.
- Chapter 35, page 1044 on schizophrenia. There is no discussion about this condition versus bi-polar condition. Many consider schizophrenia to be the same condition as bi-polar conditions. Also, include both terms in the glossary.
- Chapter 44 includes discussion of biomes based of course on latitude and longitude. Students do not know what this means anymore. Many of them have not even seen a topographic map. They use GPS on their phones, etc. and are no longer knowledgeable about the Mercator Projection. An appendix or insert needs to be included that explains what latitude and longitude is/refers to.

Usability (25 possible points)	N/A (0 pts)	Very Weak (1pt)	Limited (2 pts)	Adequate (3pts)	Strong (4 pts)	Superior (5 pts)
Is the textbook compatible with standard and commonly available hardware/software in college/university campus student computer labs?				**X**		
Is the textbook accessible in a variety of different electronic formats? (e.g. .txt, .pdf, .epub, etc.)			**X**			
Can the textbook be printed easily?				**X**		
Does the user interface implicitly inform the reader how to interact with and navigate the textbook?			**X**			
How easily can the textbook be annotated by students and instructors?				**X**		

Total Points: 13 out of 25

Please provide comments on any aspect of access concerning this textbook.

- I could not download the EPub or MOBI version of the text on to my e-reader because of a pop-up that mentioned DRM rights. This was irritating since these are supposedly open access texts. I could download it only as a PDF but at present, you cannot easily download a PDF document onto an e-reader. You have to go through Adobe Digital Editions. Once you have the PDF document on the e-reader, it does not have the same readability as EPUB/MOBI files which are designed specifically FOR e-readers/reading on line. It is very cumbersome to read a PDF document off an e-reader. This means a student may run into the same problem. I know my students and I know them well. This issue of ease of access may make or break this effort. When I tell my students to watch an online video, if they cannot just click on the link and watch the video with ease, they do not do the work. Excuses or not, this is extremely important--this field testing of every textbook on every kind of device.
- This is why I suggest to the program coordinators they employ a group of students, possibly computer

science majors/instructional technology majors (education programs), to take every single text on a 'test run' using every kind of device out there: e-readers, pads, phones, etc. In my opinion, this is the most important element of this effort. There is no doubt in my mind we can produce excellent free online texts, etc. It is the ease of their use that is critical when it comes to meeting the needs of our students and teachers.

Overall Ratings						
	Not at all (0 pts)	Very Weak (1 pt)	Limited (2 pts)	Adequate (3 pts)	Strong (4 pts)	Superior (5 pts)
What is your overall impression of the textbook?				**X**		
	Not at all (0 pts)	Strong reservations (1 pt)	Limited willingness (2 pts)	Willing (3 pts)	Strongly willing (4 pts)	Enthusiastically willing (5 pts)
How willing would you be to adopt this book?			**X**			

Total Points: 5 out of 10

Overall Comments

If you were to recommend this textbook to colleagues, what merits of the textbook would you highlight?

- Summary Tables throughout text. Most are thorough/extremely useful.
- Critical Thinking questions
- All "Connections": Career, Evolution, Sci Method aside from "Art Connections" which I think should have a different name. Otherwise, good exercises, most.
- Introduction on the scientific method/process, inductive/deductive reasoning is excellent. Suggest including an actual scientific paper--and pointing out the different parts of a sci paper (abstract--the abstract provides a summary of the paper, the methods, etc. etc.) and/or including an exercise where the student has to look up and summarize a sci. paper.
- Properties of Life--excellent
- Chapter 14: inclusion of female Nobel Prize winner, Elizabeth Blackburn (14.16)
- Chapter 15.6-Sci Method Connection-DNA extraction with kiwis and strawberries is very cool. Will capture curiosity of students.
- Biodiversity section/concept broken out by Kingdoms.
- Chapter 22: Ecological Role of prokaryotes.
- Inclusion of biofilms in text. Will be important particularly for medical students.
- Chapter 31--Few basic bio text include a chapter/section on soils.
- Chapter/Section devoted entirely to climate change (44.5).
- Chapter devoted entirely to human population growth (45.5).

What areas of this textbook require improvement in order for it to be used in your courses?

- The book is 1,525 pages long, redundant, poorly organized. I would not use this text until all areas of overlap are identified, relevant sections are consolidated, and it is better organized. I found the redundancy and disorganization frustrating.
- On the up side, the information it offers seems up-to-date, accurate, fairly informed, and scientifically valid. It has great potential.

We invite you to add your feedback on the textbook or the review to the textbook site in MERLOT
(Please register in MERLOT to post your feedback.)

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For questions or more information, contact the CA Open Educational Resources Council.